

10/699,903

H0416/AMDP949US

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph at page 13, lines 10-16 with the following amended paragraph:

The passive layer (*e.g.*, CuS) employed in organic memory devices ~~[[play]]~~ plays an important role. Its presence significantly improves the conductivity of the organic layer. This characteristic is at least partially a function of the following: charge carrier generated by CuS, build up of a charge depletion layer, charge carrier distribution in organic material, and memory loss due to charge carrier redistribution after reversing electric field. The discussion *infra* describes and illustrates charge carrier concentration and models behavior of organic memory devices.

Please replace the paragraph at page 19, lines 18-30 with the following amended paragraph:

In general, wafer processing hinges on employment of a lithographic process to create the fine featured patterns of the integrated circuit. Each layer of the chip is defined by a specific mask, and there are typically 16 to 24 mask layers in each IC. The mask can be made by patterning a film of chromium on a pure quartz glass plate to form the reticles. The patterns are formed on the chromium plated quartz ~~plated plate~~ by removing the chromium with either laser or electron-beam driven tools. The reticle is exposed step by step over the wafer. The wafer with patterned photoresist is then put into an oxide etch process to remove the oxide where there is no pattern. This has the effect of transferring the pattern to the oxide, creating barriers of oxide where it is not desired for subsequent processes to impact the silicon below. The etch may be either a classic wet chemistry or a "dry" etch which uses gas excited by a radio frequency generator to and excited plasma state. The photoresist is then stripped away by employing wet and dry strippers.

Please replace the paragraph at page 21, lines 23-32 with the following amended paragraph:

Referring now to Fig. 18, a schematic block diagram is illustrated that depicts a system 800 for forming a thin film of conductivity facilitating material (*e.g.*, copper sulfide (Cu<sub>2</sub>S, CuS))

10/699,903

H0416/AMDP949US

on a layer of conductive material (e.g., copper) in accordance with one or more aspects of the present invention, and more particularly *via* a plasma enhanced chemical vapor deposition process (PECVD) utilizing a metal organic gas precursor. It will be appreciated that formation rates may vary in response to factors including, but not limited to, gas compositions and/or concentrations, excitation voltages, temperatures and/or pressures. The formation described herein can be utilized as part of a semiconductor fabrication process wherein one or more memory cells are produced on a wafer.

Please replace the paragraph at page 22 line 14 to page 23 line 4 with the following amended paragraph:

A gas distribution system 812 is operatively coupled to the chamber 802 for selectively providing gaseous chemicals into the chamber at various rates, volumes, concentrations, etc. [[base]] based upon, among other things, the amount (thickness) of film to be formed, the composition of film(s) to be formed, the pressure within the chamber, the temperature within the chamber and/or the size of the chamber, for example. By way of illustration, the gas distribution system 812 includes one or more sources of gaseous medium (a vapor) of one or more chemical(s). In the example illustrated, the gases are provided into the chamber through a conduit 814 that terminates in a nozzle 816. While, for purposes of brevity, a single nozzle 816 is shown in Fig. 8, it is to be appreciated that more than one nozzle or other gas delivery mechanisms may be utilized to provide gas into the chamber 802 at various mixtures and/or concentrations in accordance with one or more aspects of the present invention. For example, a shower head type gas delivery mechanism can be implemented to more evenly provide chemicals into the chamber above the wafer 806, which can facilitate a more uniform chemical vapor deposition on and across the wafer. The gas distribution system 812 injects a metal organic gas into the chamber to function as a precursor in the chemical vapor deposition process. The metal organic precursor can be, for example, chelate Cu (II) diethyldithiocarbamate or  $\text{Cu}(\text{S}_2\text{CN}(\text{C}_2\text{H}_5)_2)_2$  (II), which mitigates the need for highly toxic hydrogen sulfide ( $\text{H}_2\text{S}$ ) within the process. A gaseous form of conductivity facilitating material, such as copper sulfide ( $\text{Cu}_2\text{S}$ ,  $\text{CuS}$ ), is also provided into the chamber for deposition onto the conductive layer. A gaseous form of helium can also be provided into the chamber along with the copper sulfide to serve as a

10/699,903

H0416/AMDP949US

carrier gas. It will be appreciated that other gases or plasma substances can be injected into the chamber to facilitate depositing the copper sulfide onto the conductive layer.

Please replace the paragraph at page 23 lines 5 to 18 with the following amended paragraph:

A temperature system 818 also is provided for selectively regulating the temperature within the chamber 802. For example, the system 818 may be a diffusion type system (e.g., a horizontal or vertical furnace) operable to ~~[[diffusion]]~~ diffuse heat into the chamber 802. The temperature system 818 may implement its own temperature control process or such control may be implemented as part of other sensors 820 operatively associated with the etching chamber 802. By way of example, the plasma enhanced chemical vapor deposition of copper sulfide can be carried out at a relatively low temperature of between about 400 to 600 K. A pressure system 822 is also included in the system to selectively regulate the pressure within the chamber. The pressure system 822 may include, for example, one or more vent conduits 824 having valves 826 that may be controllably opened and/or closed to varying degrees to assist with selectively adapting the pressure within the chamber 802. The deposition of copper sulfide can similarly be performed at a relatively low pressure of between about 0.05 to 0.5 Pa.